

Appl. No. 10/525,320  
Amtd. dated November 20, 2007  
In response to Office Action of August 22, 2007

### **REMARKS/ARGUMENTS**

#### **Specification**

In the specification the two paragraphs starting on page 4, line 16 and ending on page 5, line 2, have been combined and it has now been stated in the new amended paragraph that the viscosities are measured according to DIN (German Industry Standard) 53018/53019 as indicated in the U.S. Patent No. 5,480,934 where the synthesis of such polymeric dispersions is described. Reference to this DIN standard is made in column 9, lines 47-48 of the U.S. Patent No. 5,489,934 of Messner et al.

It is also acknowledged in this paragraph, as was previously acknowledged in the paragraph bridging pages 4 and 5 of the specification that the polymeric dispersions referred to in the Messner et al. patent were said to be useful as a retention agent in paper production, as a soil improvement agent or as a dispersing agent, but not as a component of the phenolic resin/PEO system as set out in the present invention.

Regarding the measurement of the viscosity at 1% concentration of the solventless polymeric dispersion in water, it is believed that the above amendment of the specification will be found satisfactory. Obviously, if the polymeric dispersions are the same as those referred to in U.S. Patent No. 5,489,934 of Messner et al., the same procedure was employed to measure their viscosities. However, it should be noted that measurement of viscosities of 1% dispersions in water is well known in the art and whether the procedure used corresponds to DIN Standards or ASTM Standards or other standards used in the industry, it should give essentially the same results.

In the papermaking industry, it is well known that papermaking retention aids are subdivided into two categories, namely flocculants and coagulants.

The flocculants are normally cationic or anionic resins, and are added to the papermaking furnish as emulsions of solids in liquids or as dry powders. They are high molecular weight polymers of which viscosities in water at 1% are higher than 2000 mPa sec.

On the other hand, the coagulants are cationic polymers which are liquid, but which have a low molecular weight, such that their viscosities in water at 1% are normally less than 1000 mPa sec. Coagulants react differently than flocculants, and require higher dosages than flocculants.

The present applicants have found a flocculating solventless cationic polymer retention aid, which in fact has the liquid properties of a coagulant, but which acts as a flocculant and therefore, operates with a higher molecular weight, and requires lower dosages, thereby producing significant advantages as pointed out in the disclosure. This is believed to be a highly unobvious finding in the papermaking art.

#### **Claim Rejections - 35 USC § 112**

In claim 1, the expression "the paper sheet" has been amended to read "a paper sheet".

Also, in claim 1 the expression "viscosities in water at 1%" has been amended to read "a viscosity at 1% of said dispersion in water" and claim 6 has been amended so as to define the retention aid essentially in the same manner as in claim 1. It is believed that this should make it clear that the viscosity is as measured "at 1% of said dispersion in water".

It is respectfully submitted that it is not necessary to specify in the claims the exact conditions, such as temperature, shear rate, etc. under which the viscosity has been measured, since this is done under standards normally accepted in the industry. For example, in previous patents, such as U.S. Patent No. 4,563,290 (claim 18), U.S. Patent No. 5,028,263 (claim 16 and claim 35), U.S. Patent No. 7,232,851 (claims 1, 12 and 21), or the Fallon U.S. Patent No. 5,571,380 cited by the Examiner, no specific conditions of viscosity measurement have been identified in the claims.

It is, therefore, believed that the claims as presently submitted should satisfy the requirements of 35 USC § 112 and it is also pointed out that claim 2 was cancelled in the Preliminary Amendment and remains cancelled herein.

#### **Claim Rejections - 35 USC § 103**

The Examiner has rejected claims 1-9 and 11-12 under 35 U.S.C. 103(a) as obvious over DeWitt U.S. Patent No. 5,516,405 in view of Mannur et al. U.S. Patent No. 5,480,934. This rejection is respectfully traversed for the following reasons:

First of all, as pointed out above, claim 2 has been previously cancelled and remains cancelled and it is therefore removed from consideration.

The two independent claims 1 and 6 are distinct from DeWitt by the fact, as stated by the Examiner himself, that they do not use a liquid, aqueous, solventless dispersion of a cationic polymer, without oil phase, having the claimed viscosity as a retentive aid for a papermaking furnish.

The invention of DeWitt resides in the finding that a cationic fixative of the type which was generally used in the trade, such as polyethylenes amide or small polymers such as poly-dialyl-dimethyl ammonium chloride and similar substances (c.f. column 2, lines 22-26), which are known in the art as low molecular weight coagulants, can be effectively used in conjunction with the phenolic resin/PEO retention and drainage system.

DeWitt, therefore, limits himself strictly to the use of liquid solutions of low molecular weight as a cationic fixative or coagulant in conjunction with the phenolic resin/PEO system. On the other hand, it is well known in the art that if one dissolves a single component high molecular weight polymer in aqueous solution, the viscosity at 1% concentration or even at 0.5%, would be in excess of 20,000 mPa sec.

The unexpected feature of the present invention is to have found that one can have a high molecular weight polymer in solution, but with low viscosity between 2000 and 20,000 mPa sec,

which when used as a retention aid in conjunction with the phenolic resin/PEO system, produces significant advantages as disclosed in the specification. Thus, the applicants have found that such retention aid has liquid properties of a coagulant, but actually acts as a flocculant by operating with a higher molecular weight and thus requiring lower dosages and thereby also lowering the operating cost. The polymers in question are two-component polymers such as disclosed in Messner et al., as has been acknowledged in applicants' specification. However, Messner et al. neither mention nor suggest that their polymers are suitable for use as retention aids in conjunction with phenolic resin/PEO systems and DeWitt does not suggest that any high molecular weight cationic polymers could be used in lieu of its low molecular weight cationic finatives. A person skilled in the art would, therefore, not come to the conclusion that the high molecular weight polymers of Messner et al. would be suitable in the system of DeWitt using low molecular weight polymers, and further that the high molecular weight polymers of Messner et al. would react in the system such as disclosed by DeWitt as if they were low molecular weight polymers in so far as their viscosity is concerned. The applicants submit that this is a highly unobvious finding.

In fact, in the PCT application that was handled by the EPO office, of which the present application is the national U.S. phase, the two references on which the Examiner relies were also cited. However, in his International Preliminary Examination Report, the PCT examiner has found that applicants' claims possess the attributes of novelty, inventive step and industrial applicability. In this regard, he stated:

"Said cationic polymer retention aid has the liquid properties of a coagulant (known as having low molecular weights normally less than 1,000 mPa sec), but acts as a flocculant. Therefore, the same effect can be achieved with lower dosages. In this regard, it is different from all other retention aids mentioned in the cited prior art.

"The synthesis of such polymeric dispersions is described in US-A-5 480 934 (D5).

Although their use as retention agent in paper production is mentioned in D5, no suggestion is made that they could be used as a component of the phenolic resin/PEO system."

It is respectfully submitted that the same reasoning applies to the claims of the present U.S. phase application.

Finally, the Examiner applied against claim 10 U.S. Patent No. 5,571,380 of Fallon in addition to DeWitt and Messner et al.

In this regard, it is submitted that Fallon uses high molecular weight cationic polymers (c.f. column 6, lines 60-65) and does not use a phenolic resin/PEO system. Consequently, a person skilled in the art would have no incentive whatsoever to combine Fallon with DeWitt who uses low molecular weight polymers.

In view of the above amendments and remarks, reconsideration and allowance of the application are solicited.

The Examiner is invited to call applicants' agent if any questions remain following review of this response.

Respectfully submitted,



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